

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Bernd Schöller, et al
Title: Procedure For The Control Of A Respirator Device As Well As
Apparatus For Monitoring
Attorney Docket: 6056-000039

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Preliminary to the examination of this application on its merits, please enter the
following amendments:

IN THE SPECIFICATION

Page 1, lines 2 through 9, please delete the following:

HANSMANN • KLINKOW • HANSMANN
European Patent Attorneys

Dierk Hansmann, Dipl.Eng.; Dr. Hans-Henning Klickow; Georg Hannsmann (†1977)
Telephone international (+ +49 40) 38 24 57/3 89 84 45 Fax international (+ +49 40) 3 89 35
02 JESSENSTRASSE 4 22767 HAMBURG TEL. (040) 38 24 57/3 89 84 45 FAX (040) 3 89
35 02

P.6628 EU

Applicant: Gottlieb Weinmann Geräte für Medizin und Arbeitsschutz GmbH & Co.
Kronsaalsweg 40, 25525 Hamburg

Please replace the following paragraphs of the specification. Applicant includes herewith an Attachment for Specification Amendments showing a marked up version of each replacement paragraph.

Page 1, please replace lines 12 through 15 with the following:

BACKGROUND AND SUMMARY OF THE INVENTION

The invention concerns a procedure for the control of a respirator device, in which one can set at least two different pressure levels of a breathable-gas supply and in which at least one respirator-treatment parameter is captured by a measurement technique and is evaluated for the purpose of controlling the respirator-treatment pressure.

Page 5, please replace lines 22 through 27 with the following:

BRIEF DESCRIPTION OF THE DRAWINGS

Examples of embodiment of the invention are schematically shown in the drawings.

Fig. 1 shows a theoretical block diagram for implementing a CPAP respirator treatment with supplementary pattern recognition;

Fig. 2 shows a schematic representation of the principal components in the realization of a CPAP respirator treatment;

Page 6, please replace lines 1 through 6 with the following:

Fig. 3 is a representation of a typical evolution pattern to which pattern recognition is applicable;

Fig. 4 is a representation of measurement signals in the capture of distinctive form features in the occurrence of snoring; and

Fig. 5 is a representation similar to the representation in Fig. 4 in a capture of distinctive time features.

Page 6, please replace lines 7 through 16 with the following:

DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 shows in a schematic theoretical representation an apparatus for the control of a respirator device. Here the respirator device is intended for the CPAP respirator treatment of a patient (1). The patient (1) is connected via a breathing mask (2) and a breathing hose (3) to a source of compressed gas (4). The compressed-gas source (4) may be implemented, for instance, as a controllable aerator. In the example of embodiment shown here, one or several sensors (5) are arranged in the area of the breathing mask (2), in order to capture at least one respirator-treatment parameter. However, in accordance with other examples of embodiment the sensors (5) can also be arranged in the area of the breathing hose or in the area of the compressed-gas source (4).

Page 19, please replace lines 1 through 3 with the following:

ABSTRACT OF THE DISCLOSURE

Page 15, lines 1 through 8, please delete the following:

HANSMANN • KLINKOW • HANSMANN
European Patent Attorneys

Dierk Hansmann, Dipl.Eng.; Dr. Hans-Henning Klickow; Georg Hannsmann (†1977)
Telephone international (+ +49 40) 38 24 57/3 89 84 45 Fax international (+ +49 40) 3 89 35
02 JESSENSTRASSE 4 22767 HAMBURG TEL. (040) 38 24 57/3 89 84 45 FAX (040) 3 89
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Applicant: Gottlieb Weinmann Geräte für Medizin und Arbeitsschutz GmbH & Co.
Kronsaalsweg 40, 25525 Hamburg

IN THE CLAIMS

Please amend the claims in accordance with the following rewritten claims in
clean form. Applicant includes herewith an Attachment for Claim Amendments showing a
marked up version of each amended claim.

1. (Amended) A procedure for the control of a respirator device, in which one can set
at least two different pressure levels for a breathable gas supply and in which at least one
respirator-treatment parameter is captured by measurement technique and is evaluated for the
control of the respirator-treatment pressure; characterized in that at least one of the
respirator-treatment parameters is modified as a function of a pattern recognition; in order to
carry out the pattern recognition the time-wise evolution of at least one respirator-treatment
parameter is captured, at least at intervals, and is analyzed with respect to typical evolution
patterns.

2. (Amended) A procedure according to Claim 1, characterized in that an existing pressure level for breathing support is overlaid at least temporarily with a stimulating stream oscillating at a defined frequency.

3. (Amended) A procedure according to Claim 1, characterized in that, after a selective evaluation of an oscillatory pressure amplitude, occurring with the frequency of the stimulating stream in the air delivery of a patient (which corresponds to a breathing resistance of the patient), a selection of the respective pressure amplitude is carried out.

4. (Amended) A procedure according to claim 3, characterized in that a CPAP respirator treatment is carried out.

5. (Amended) A procedure according to Claim 3, characterized in that at least one electrical signal is evaluated during the pattern recognition.

6. (Amended) A procedure according to Claim 1, characterized in that a physical signal is evaluated during the pattern recognition.

7. (Amended) A procedure according to Claim 1, characterized in that a derivation of classes of errors is implemented in the context of the pattern recognition.

8. (Amended) A procedure according to Claim 1, characterized in that an OPS signal (Oscillating Pressure Signal) is evaluated.

9. (Amended) A procedure according to Claim 1, characterized in that a static pressure signal is evaluated.

10. (Amended) A procedure according to Claim 1, characterized in that a pressure variation is evaluated.

11. (Amended) A procedure according to Claim 1, characterized in that a flow signal is evaluated.

12. (Amended) A procedure according to Claim 1, characterized in that a signal proportional to the flow signal and/or to a pressure-dependent signal is evaluated.

13. (Amended) A procedure according to Claim 1, characterized in that an electrical-drive parameter of the compressed-gas supply is evaluated.

14. (Amended) A procedure according to Claim 1, characterized in that in the pattern recognition, distinctive form features are evaluated.

15. (Amended) A procedure according to Claim 1, characterized in that in the pattern recognition, distinctive time features are evaluated.

16. (Amended) A procedure according to Claim 1, characterized in that following the pattern recognition, a class assignment is carried out.

17. (Amended) An apparatus for monitoring at least one respirator-treatment parameter in the breathing-gas supply to a patient, featuring at least one sensor for the capture of the time-wise evolution of the respirator-treatment parameter, which sensor is arranged in the area of an air delivery, which air delivery encompasses a respirator device as well as a connecting installation; characterized in that the sensor (5) is connected to an analyzer (11) which carries out a pattern recognition and which analyzer is attached to a control (6) for the modification of at least one respirator-treatment parameter.

18. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) is coupled to a storage (12) for the supply of comparative patterns.

19. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) is coupled with a classifier (13).

20. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) features a time-wise-evolution analyzer.

21. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) features a form analyzer.

22. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) for pattern recognition is designed as part of a respirator device for the implementation of CPAP respirator treatment.

23. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) features a storage for at least one measured variable.

24. (Amended) An apparatus according to Claim 17, characterized in that the control (6) features an adaptation element for implementing a pressure modification as a function of the stored measured-variable.

25. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) features at least one storage for data of a patient population.

26. (Amended) An apparatus according to Claim 17, characterized in that the control (6) features an adaptation element for the implementation of a pressure modification as a function of the stored information on the patient population.

27. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) is provided with a neuron network.

28. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) is provided with fuzzy logic.

29. (Amended) An apparatus according to Claim 17, characterized in that the sensor (5) is connected to at least one scanning element.

30. (Amended) An apparatus according to Claim 29, characterized in that the scanning element is connected to a band pass filter.

31. (Amended) An apparatus according to Claim 30, characterized in that the band pass filter is designed as a digital filter.

32. (Amended) An apparatus according to Claim 17, characterized in that the control (6) is connected to a generator for the production of receptor-stimulating pressure signals.

33. (Amended) An apparatus according to Claim 17, characterized in that the analyzer (11) features separate evaluations for inspiration- and for expiration- pressure readings.

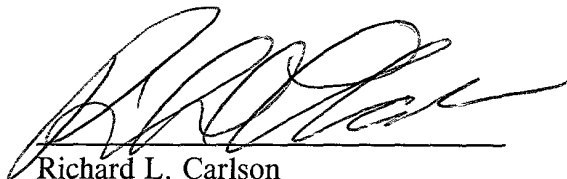
34. (Amended) An apparatus according to Claim 33, characterized in that different pressure-control characteristics are provided for inspiration- and expiration- pressure readings.

REMARKS

The above amendments are made with reference to the enclosed English language translation of the German language application and are made to conform this German language application to the United States Patent and Trademark Office rules of practice as well as to eliminate the multiple dependency of the claims. Accordingly, favorable consideration and entry of this amendment is respectfully requested.

Respectfully submitted,

By:



Richard L. Carlson
Reg. No. 27863
Attorney for Applicants

Harness, Dickey & Pierce, P.L.C.
P. O. Box 828
Bloomfield Hills, MI 48303
(248) 641-1600

March 23, 2001
RLC/jb

ATTACHMENT FOR SPECIFICATION AMENDMENTS

The following is a marked up version of each replacement paragraph and/or section of the specification in which underlines indicates insertions and brackets indicate deletions.

Page 1, lines 12 through 15:

BACKGROUND AND SUMMARY OF THE INVENTION

The [Invention] invention concerns a procedure for the control of a respirator device, in which one can set at least two different pressure levels of a breathable-gas supply and in which at least one respirator-treatment parameter is captured by a measurement technique and is evaluated for the purpose of controlling the respirator-treatment pressure.

Page 5, lines 22 through 27:

BRIEF DESCRIPTION OF THE DRAWINGS

Examples of embodiment of the [Invention] invention are schematically shown in the [drawing] drawings. [The following are shown:]

Fig. 1 shows [A] a theoretical block diagram for implementing a CPAP respirator treatment with supplementary pattern recognition;

Fig. 2 shows [A] a schematic representation of the principal components in the realization of a CPAP respirator treatment;

Page 6, lines 1 through 6:

Fig. 3 is [A] a representation of a typical evolution pattern to which pattern recognition is applicable;

Fig. 4 is [A] a representation of measurement signals in the capture of distinctive form features in the occurrence of snoring; and

Fig. 5 is [A] a representation similar to the representation in Fig. 4 in a capture of distinctive time features.

Page 6, lines 7 through 16:

DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 shows in a schematic theoretical representation an apparatus for the control of a respirator device. Here the respirator device is intended for the CPAP respirator treatment of a patient (1). The patient (1) is connected via a breathing mask (2) and a breathing hose (3) to a source of compressed gas (4). The compressed-gas source (4) may be implemented, for instance, as a controllable aerator. In the example of embodiment shown here, one or several sensors (5) are arranged in the area of the breathing mask (2), in order to capture at least one respirator-treatment parameter. However, in accordance with other examples of embodiment the sensors (5) can also be arranged in the area of the breathing hose or in the area of the compressed-gas source (4).

Page 19, lines 1 through 3:

[SUMMARY]

ABSTRACT OF THE DISCLOSURE

[Procedure for the control of a respirator device as well as apparatus for monitoring]

Page 19, lines 1 through 3:

ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

1. (Amended) [Procedure] A procedure for the control of a respirator device, in which one can set at least two different pressure levels for a breathable gas supply and in which at least one respirator-treatment parameter is captured by measurement technique and is evaluated for the control of the respirator-treatment pressure; characterized in that at least one of the respirator-treatment parameters is modified as a function of a pattern recognition; in order to carry out the pattern recognition the time-wise evolution of at least one respirator-treatment parameter is captured, at least at intervals, and is analyzed with respect to typical evolution patterns.

2. (Amended) [Procedure] A procedure according to Claim 1, characterized in that an existing pressure level for breathing support is overlaid at least temporarily with a stimulating stream oscillating at a defined frequency.

3. (Amended) [Procedure] A procedure according to [Claims 1 or 2] Claim 1, characterized in that, after a selective evaluation of an oscillatory pressure amplitude, occurring with the frequency of the stimulating stream in the air delivery of a patient (which corresponds to a breathing resistance of the patient), a selection of the respective pressure amplitude is carried out.

4. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 3]
Claim 3, characterized in that a CPAP respirator treatment is carried out.

5. (Amended) [Proceeding] A procedure according to [one of the Claims 1 through 4]
Claim 3, characterized in that at least one electrical signal is evaluated during the pattern
recognition.

6. (Amended) [Procedure] A procedure according to [one of the Claim 1 through 4]
Claim 1, characterized in that a physical signal is evaluated during the pattern recognition.

7. (Amended) [Procedure] A procedure according to [one of the Claim 1 through 6]
Claim 1, characterized in that a derivation of classes of errors is implemented in the context of
the pattern recognition.

8. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 7]
Claim 1, characterized in that an OPS signal (Oscillating Pressure Signal) is evaluated.

9. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 8]
Claim 1, characterized in that a static pressure signal is evaluated.

10. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 8] Claim 1, characterized in that a pressure variation is evaluated.

11. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 8] Claim 1, characterized in that a flow signal is evaluated.

12. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 8] Claim 1, characterized in that a signal proportional to the flow signal and/or to a pressure-dependent signal is evaluated.

13. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 9] Claim 1, characterized in that an electrical-drive parameter of the compressed-gas supply is evaluated.

14. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 13] Claim 1, characterized in that in the pattern recognition, distinctive form features are evaluated.

15. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 14] Claim 1, characterized in that in the pattern recognition, distinctive time features are evaluated.

16. (Amended) [Procedure] A procedure according to [one of the Claims 1 through 15] Claim 1, characterized in that following the pattern recognition, a class assignment is carried out.

17. (Amended) [Apparatus] An apparatus for monitoring at least one respirator-treatment parameter in the breathing-gas supply to a patient, featuring at least one sensor for the capture of the time-wise evolution of the respirator-treatment parameter, which sensor is arranged in the area of an air delivery, which [air delivery] encompasses a respirator device as well as a connecting installation; characterized in that the sensor (5) is connected to an analyzer (11) which carries out a pattern recognition and which [analyzer] is attached to a control (6) for the modification of at least one respirator-treatment parameter.

18. (Amended) [Apparatus] An apparatus according to Claim 17, characterized in that the analyzer (11) is coupled to a storage (12) for the supply of comparative patterns.

19. (Amended) [Apparatus] An apparatus according to [Claims 17 or 18] Claim 17, characterized in that the analyzer (11) is coupled with a classifier (13).

20. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 19] Claim 17, characterized in that the analyzer (11) features a time-wise-evolution analyzer.

21. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 20] Claim 17, characterized in that the analyzer (11) features a form analyzer.

22. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 21] Claim 17, characterized in that the analyzer (11) for pattern recognition is designed as part of a respirator device for the implementation of CPAP respirator treatment.

23. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 22] Claim 17, characterized in that the analyzer (11) features a storage for at least one measured variable.

24. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 23] Claim 17, characterized in that the control (6) features an adaptation element for implementing a pressure modification as a function of the stored measured-variable.

25. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 24] Claim 17, characterized in that the analyzer (11) features at least one storage for data of a patient population.

26. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 25] Claim 17, characterized in that the control (6) features an adaptation element for the implementation of a pressure modification as a function of the stored information on the patient population.

27. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 26] Claim 17, characterized in that the analyzer (11) is provided with a neuron network.

28. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 26] Claim 17, characterized in that the analyzer (11) is provided with fuzzy logic.

29. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 25] Claim 17, characterized in that the sensor (5) is connected to at least one scanning element.

30. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 29] Claim 29, characterized in that the scanning element is connected to a band pass filter.

31. (Amended) [Apparatus] An apparatus according to Claim 30, characterized in that the band pass filter is designed as a digital filter.

32. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 31] Claim 17, characterized in that the control (6) is connected to a generator for the production of receptor-stimulating pressure signals.

33. (Amended) [Apparatus] An apparatus according to [one of the Claims 17 through 32] Claim 17, characterized in that the analyzer (11) features separate evaluations for inspiration- and for expiration- pressure readings.

34. (Amended) [Apparatus] An apparatus according to Claim 33, characterized in that different pressure-control characteristics are provided for inspiration- and expiration- pressure readings.